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New Davies Petroleums Limited

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The engineer's reports prepared by Professor T. C. Phemister of the University of Aberdeen, Consulting Geologist for New Davies, are enclosed for your information.

A summary of the work done in the past and by New Davies in their current drilling program is set out in these reports.

The properties referred to have now been combined and are one, for the purpose of the agreement with Consolidated Gold Fields.

NEW DAVIES PETROLEUMS LIMITED

SITUATION. This property is situated 2½ miles north of the village of Strontian, Argyllshire, from which it can be reached by road. Strontian itself is about 130 miles by road and ferry from Glasgow.

AREA. The area of the property is 1380 acres.

GEOLOGY. The country rock consists of mica-schists and quartzite injected irregularly by granite gneiss. These rocks are cut by a large mass of granite (tonalite) and the contact runs across the southern part of the property. Cutting all of these rocks is a discontinuous string of basic dykes that runs roughly east-west. Alongside these dykes the rocks are highly sheared and it is in this shear zone that the vein occurs. All of the structures at the surface dip steeply to the south and the straightness of the outcrop over this hilly country suggests that the zone is vertical. This band of shearing and veining appears to have no direct connection with the granite as it cuts sharply across its contact with the schists and is quite unaffected by it.

VEIN. The vein itself consists of calcite and barytes in various proportions along with sheets and films of highly altered wall rock. The width is very variable and runs from a matter of a foot or two to as much as 50 feet, the latter figure representing a zone of extensive veining in sheared and altered rock.

Within the vein itself the ore minerals are galena and zinblende and these occur both as a general low grade mineralization and also as discontinuous ore-shoots and stringers.

The latest event in the geology is the intrusion of basalt dykes which cut the veins and in some cases may have come in along small faults.

EARLIER WORK. The main activity was in the periods 1790 to 1815 and 1850 to 1872. The work consisted of following ore shoots down from the surface so that the stopes are very irregular in shape and distribution. The major engineering work was the driving of an adit from the south to intersect the vein at a depth of about 180 feet with the extension from this of a level along the vein 1272 feet to the east and 708 feet to the west, the "grand level". Though there are reports of deeper workings it is probable that only the odd hole ever went beyond 200 feet and practically all of the mining stopped at smaller depths.

It is clear from the material in the old dumps that the miners were interested only in ore that was very rich in galena and that the methods of concentration available were incapable of dealing with anything running less overall than say 10% lead free from zinc.

OBJECTIVE OF PRESENT EXPLORATION.

As the vein is located in a well developed feature that is certainly continuous over a length of 7000 feet, it is reasonable to assume that it will persist down to at least 1500 feet. Within it the ore-shoots will lie at various horizons and some may not reach the surface. A drilling programme was therefore entered on to test the prolongation of the vein in depth and get some idea of how the values are distributed throughout the vein. All of the holes were inclined at angles from 50 to 70 degrees so that any parallel vein to one side of the main zone would be intersected.

RESULTS. Up to the present 17 holes have been completed, their lengths ranging from 354 to 714 feet with a total footage of 8,894 feet. Hole 18 is in course of drilling and at present is around 350 feet. While core recovery has been excellent in the hard and unsheared rock it has been poor in the vein which is very soft and open in texture. In one case the recovery was as low as 51% and an average figure, which improved somewhat with later holes, was around 80%. What was particularly frustrating was that core was frequently lost in the vicinity of small ore shoots so that there is a possibility that the figures obtained may be on the low side. The values cited here are based mainly on assays of solid core with information from wash samples where core was lost.

The drilling shows that there is no doubt at all that the vein continues to a vertical depth of 700 feet and certainly well beyond this figure as there is no sign of it narrowing with depth though it obviously pinches and swells. Furthermore it carries workable values at this depth though they are not evenly distributed. The best part of the vein in the property is in the 600 feet length at the western end where the values run from lead 9%, zinc 1%, silver 0.8 ozs. over 8 feet to lead 16%, zinc a trace, silver 2 ozs. over 19 feet, these values being at vertical depths of from 550 to 690 feet. All accounts agree that this was one of the richest parts of the vein at the surface so that there is the probability here of a substantial amount of good ore. Though the results about the middle of the vein and at the extreme eastern end are less encouraging, the holes between these two parts give values from lead 4.87%, zinc 0.37%, silver 0.20 ozs. to lead 7.17%, zinc 0.28%, silver 1.00 ozs., over widths of around 15 feet. This is of considerable interest as the grand level which runs here at a depth of about 180 feet was said to be unpromising. It is possible therefore that ore shoots may occur below this horizon.

A constant constituent of the vein is barytes which varies in amount from 5 to 50%. It is difficult to give an average figure but 20% is a conservative estimate for the vein as a whole. While not of the highest quality it is yet a valuable constituent and on any flow sheet it will be recovered in a pure state. It is thus to be taken into account in assessing the economics of the ore.

CERTIFICATE

1. I am Professor of Geology and Mineralogy at Aberdeen University.
2. My university degrees are —
Glasgow: B.Sc. (Mining), D.Sc. (Geology).
Cambridge: Ph.D. (Mineralogy and Petrology).
Chicago: M.Sc. (Geology).
3. I have no interest directly or indirectly in New Davies Oils, Ltd. or in the Scottish Canadian Highland Development and Exploration Ltd.
4. This report dated 4th November, 1964 is based on my personal knowledge of the Strontian area.

T. C. PHEMISTER

4th November, 1964.

THE SCOTTISH CANADIAN HIGHLAND DEVELOPMENT AND EXPLORATION LIMITED

SITUATION. The region acquired for prospecting is in the Sunart estate which comprises the land between Loch Shiel on the north and Loch Sunart on the south in Argyllshire. It is entered at Strontian by road from the south side and by this route it is distant about 130 miles from Glasgow.

AREA. The area acquired in the estate is around 32,200 acres.

GEOLOGY. The rocks are mainly metamorphic and consist of micaschists and quartzites in great part injected by granite veins. On the southern side of the region these rocks are cut by the northern end of a large granite (tonalite) body that stretches 10 miles or so further south. Narrow basic dykes cut all of these rocks.

MINERALIZATION. The region has long been known for the lead-zinc veins which have been worked off and on in the 18th and 19th centuries. All the veins exploited in the past occur in a zone about $4\frac{1}{4}$ miles long and running roughly east-west across the middle of the region, about $3\frac{1}{2}$ miles north of Strontian village. These veins are situated along zones of shearing which occur usually along basic dykes running roughly east and west. The gangue consists of calcite and barytes in varying proportions, the ore minerals being galena and zinblende.

The veins appear to be unconnected with the granite as some cut right across the end of this body and are controlled entirely by the later shearing which has affected all the rocks, schists, gneisses and granite alike.

PREVIOUS WORK. Three main parts of this $4\frac{1}{4}$ mile zone have been exploited by the early miners; on the west, the Corrantee vein, in the middle the so-called Strontian main vein, and on the west a set of at least 5 veins grouped together as the Fee Donald mines. Between these sections there are occasional signs of shearing and mineralization which suggest connecting veins and in places small holes have been opened to explore these and possibly recover some ore.

The major engineering work in the early days was the driving of an adit 1230 feet long from the south to intersect the Strontian main vein at a depth of about 180 feet with the extension from this of a level along the vein 1272 feet to the east and 708 feet to the west, the "grand level".

Between 1950 and 1958 magnetic, geochemical and air surveys were made of parts of the ground and sampling of parts of the old workings were carried out but no drilling or mining was attempted.

PRESENT EXPLORATION. This has been concerned mainly with field mapping of the geology and particularly with the assessment on the ground of all the reports and records of previous workings. As well as the Strontian main vein section, which is being explored by New Davies Petroleums, Ltd., special attention has been paid to the Corrantee and Fee Donald mines and also to the stretches in between.

At the Corrantee the vein is exposed over a distance of about 2700 feet and is seen to vary between 1.5 and 15 feet in width. The dip is very steep to the south. The old workings have penetrated the vein horizontally to around 750 feet and vertically to a depth of 200 feet. So far as one can see there is no sign that the vein is diminishing or losing its values along the strike or in depth and this is borne out also by all the records that are available. The old dumps contain a large amount of zinblende and even allowing for the metallurgical difficulties that would obtain when the deposit was worked it looks as though there was a higher percentage of zinc here than in the veins to the east. This is borne out also by the evidence from the walls of the old stopes. Sampling of these by one of the operators in 1950 gave values around lead 5.37%, zinc 5.85%, silver 1.85 ozs. but there is always the question here whether this is typical of the ore that was actually taken out. An assay of hand-picked galena made some years ago gave 18 ozs. of silver per ton of the mineral.

The gangue differs from that of the veins to the east in that, although calcite and barytes are still abundant, quartz also appears and in parts of the vein is the main non-metallic material. As well as the zinblende and galena traces of chalcopyrite are also present and all of this suggests that we may possibly have here a different horizon of mineralization from that to the east.

Followed to the east, the vein forks, one branch running 80° E of N and the other 105° E of N. The southerly branch cannot be followed owing to the cover but the northerly one has been worked by open cast and carries ore. This vein is running towards the Strontian main vein and if it keeps its course should intersect it 1300 yards to the east. About this point in fact two veins carrying white barytes were opened in the early workings by trial pits. One of these veins is in the line of the main Strontian vein and is probably a continuation of it. The fact that the present drilling by New Davies has shown that the main vein continues downwards to at least 1000 feet and carries values at this depth gives this intermediate ground a new interest and reinforces the possibility that there may be ore at depth between the Corrantee and the main vein.

At the other end of the $4\frac{1}{4}$ mile vein zone, the Fee Donald presents a different structural picture from the more westerly sections for here, in the side of the stream, at least five veins are exposed, three running about 93° , one 75° and the other, a cross one, 177° , all east of north. These occupy a zone something over half a mile in width; that is, much wider than the veins to the west. Only one of these veins has been worked extensively by the early miners who drove four levels and took out ore to a maximum penetration into the hillside of 1266 feet.

This set of veins is well to the north of the line of the Corrantee and Strontian main veins and its occurrence suggests that there may be more than one zone of mineralization in the area. On the south side of the zone also one of the veins strikes southwestwards towards the main vein and here again there is the possibility of connecting veins between the zones.

The easterly continuation of the Strontian main vein is along the line of a dyke that runs south of east and at the sides of which small pockets of mineralization occur. These have still to be explored as have also other small veins that have been found both in the granite and in the schists.

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